

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

In the Matter of	)	
	)	
Digital Audio Broadcasting Systems	)	MM Docket No. 99-325
And Their Impact On the Terrestrial Radio	)	
Broadcast Service	)	
	)	

**REPLY COMMENTS OF  
THE NATIONAL ASSOCIATION OF BROADCASTERS**

**NATIONAL ASSOCIATION OF  
BROADCASTERS**

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## **Summary**

The National Association of Broadcasters' reply comments regarding the "In-band/On-channel Digital Radio Broadcasting Standard NRSC-5" developed by the NRSC agree with the comments of many radio groups and others encouraging the FCC to incorporate NRSC-5 into its technical rules as the foundation for digital radio transmissions for AM and FM broadcasting in the U.S.

NAB recommends the NRSC-5 AM and FM IBOC standard as a competent, sufficient, useful documentation of the iBiquity system. Contrary to Impulse Radio's comment that iBiquity controls the documents in the standard, the reference documents that are part of the standard were "frozen" at the time the standard was adopted and will be maintained by the NRSC. The documents referenced in the standard cannot be modified except in relation to future modifications of the standard and under NRSC's explicit instructions and procedures.

The Commission should dismiss comments that advocate reconsidering IBOC as the approach for digital radio or urge other spectrum options, as the Commission has already decided those issues. Similarly, this is not the place to address individual and other commenters that express concerns regarding interference. While important to be adequately addressed, these issues have already been briefed to the FCC and are not germane to the scope of the issues in the present comment cycle. Moreover, we are optimistic that any interference to stations' protected coverage areas will be adequately dealt with on a case-by-case basis either by the adjustment of IBOC digital energy or other means. At this time it is very important that the Commission begin to characterize the interference environment nationwide as stations go on the air with IBOC with a view

toward setting up interference mitigation techniques in the final rules. NAB recommends that the FCC should deal with Broadcast Company of the Americas' example of actual interference with AM IBOC as a matter of individual interference resolution. In this regard, we note that the FCC has decided that the overall benefits of digital radio are worth dealing with individual instances of interference. Importantly, NAB points to the need to move AM IBOC forward with FM IBOC, so as not to risk leaving AM behind.

NAB agrees with CEA that, while the IBOC standard's lack of a documented codec is not ideal, it is workable. It was an acceptable trade-off for the NRSC to decide to proceed with standardization without disclosure of the details of iBiquity's codec, which iBiquity for internal business reasons would not disclose. In response to comments that the standard should be remanded for this reason, NAB finds this step to be unnecessary, stating that iBiquity's or other codecs can be utilized, and without a codec identifier. Similarly, the addition of a fully specified advanced data broadcasting transport protocol (work on which is nearing completion within the NRSC) is not necessary for incorporation of the main IBOC transmission standard into the Commission's rules.

Finally, NAB fully supports the NRSC process as fair, open, conducted under due process procedures with opportunity to be heard and with active participation by diverse parties and resolution of conflicting views. The process was one of documentation of a single system, which was the result of merged IBOC proponents, and was fairly conducted and endorsed by the vote of many, independent participants. The Committee's decision to complete work on the main transmission standard, ahead of the data standard, and submit it to the FCC was appropriate.

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**Reply Comments of  
The National Association of Broadcasters**

The National Association of Broadcasters (NAB)<sup>1</sup> hereby files reply comments in response to comments filed in this docket regarding the “In-band/On-channel Digital Radio Broadcasting Standard NRSC-5” (NRSC-5) developed by the National Radio Systems Committee (NRSC).<sup>2</sup> NAB supports the FCC’s incorporating NRSC-5 into its technical rules as the foundation for digital radio transmissions for AM and FM broadcasting in the United States. NRSC-5 will prove to be a solid standard, one that sufficiently and well documents iBiquity’s IBOC system chosen by the Commission to enable both AM and FM broadcasters to enter the digital age now and serve consumers with digitally-enhanced, robust audio services and additional auxiliary services, while remaining compatible with analog receivers and current services. NAB also strongly

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<sup>1</sup> NAB is a non-profit, incorporated association of radio and television stations and networks that serves and represents the American broadcast industry.

<sup>2</sup> The NRSC is an open technical standards-setting organization jointly sponsored by NAB and the Consumer Electronics Association. Its purpose is to study, develop and make recommendations for technical standards that relate to radio broadcasting and the reception of radio broadcast signals.

supports the NRSC process that developed this standard under fair, open, due process procedures, and with active participation by diverse parties and resolution of conflicting views.

### **NRSC-5 Well Documents iBiquity's IBOC System**

NAB in its initial comments described in detail the exhaustive work of the NRSC in testing, evaluating and documenting iBiquity's AM and FM systems to produce NRSC-5.<sup>3</sup> As a co-sponsor of the NRSC, NAB has first-hand knowledge and great faith in the work of the NRSC in developing this IBOC standard. As the major trade association representing radio broadcasters, we have taken this work very seriously. Indeed, the future of radio broadcasting in the U.S. rests on this effort. We have confidence in the work product of the NRSC and fully endorse NRSC-5 as the basis of the FCC's technical rules for AM and FM IBOC broadcasting.

Joining NAB in supporting NRSC-5 are many radio companies. National Public Radio, Susquehanna Radio, Disney/ABC, Entercom Communications, Greater Media and Infinity Broadcasting all urge incorporation of NRSC-5 into the FCC rules.<sup>4</sup> Various consumer electronics manufacturing companies participated in the NRSC IBOC process and voted in favor of NRSC's adopting NRSC-5. The Consumer Electronics Association and Harris Corporation, both intimately involved with evaluation of iBiquity's IBOC

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<sup>3</sup> Comments of the National Association of Broadcasters, MM Docket No. 99-325, filed July 18, 2005 at 4-5.

<sup>4</sup> Comments of National Public Radio, MM Docket No. 99-325, filed July 18, 2005 (NPR); Comments of Susquehanna Radio Corp., MM Docket No. 99-325, filed July 18, 2005 (Susquehanna); Comments of Walt Disney Company and ABC, Inc., MM Docket No. 99-325, filed July 18, 2005 (ABC); Joint Comments of Entercom Communications Corp., Greater Media, Inc. and Infinity Broadcasting Corporation, MM Docket No. 99-325, filed July 18, 2005 (Entercom, Greater Media and Infinity).

system, have filed with the FCC endorsing NRSC-5.<sup>5</sup> So, too, has the International Association of Audio Information Services, representing small, community broadcast services for the blind and those visually, physically and cognitively disabled, filed comments in support of the NRSC-5 standard.<sup>6</sup>

NAB recommends the NRSC-5 AM and FM IBOC standard as a competent, sufficient, useful documentation of the iBiquity system. The NRSC-5 standard is structured as a main document (the standard itself) that provides an overview of the AM and FM IBOC systems designed by iBiquity Digital Corporation and a set of reference documents authored by iBiquity, with input from the NRSC, which provide the detailed information needed for those skilled in the art to construct compatible equipment. These reference documents are publicly available on the NRSC website and were fully vetted by the NRSC.<sup>7</sup>

Impulse Radio incorrectly states in its comments that these reference documents are controlled by iBiquity and not the standards developer, NRSC. Impulse then argues that iBiquity control is improper.<sup>8</sup> Here, as elsewhere, Impulse is simply wrong. At the time the standard was adopted, the reference documents were “frozen” and these documents will be maintained by the NRSC. iBiquity may continue to modify their version of these documents, for their own internal use (or the use of their licensees) as an

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<sup>5</sup> Comments of the Consumer Electronics Association, MM Docket No. 99-325, filed July 18, 2005 (CEA); Comments of Harris Corporation, MM Docket No. 99-325, filed July 18, 2005 (Harris).

<sup>6</sup> Comments of the International Association of Audio Information Services, MM Docket No. 99-325, filed July 18, 2005 (IAAIS).

<sup>7</sup> See [www.nrscstandards.org/Standards/NRSC-5/NRSC-5/asp](http://www.nrscstandards.org/Standards/NRSC-5/NRSC-5/asp).

<sup>8</sup> Comments of Impulse Radio on National Radio Systems Committee’s “In-Band/On-Channel digital Radio Broadcasting Standard NRSC-5, MM Docket No. 99-325, filed July 18, 2005 (Impulse Radio) at 8.

implementer of the NRSC standard. But the documents referenced in the standard will not be modified except in relation to future modifications of the standard and under NRSC's explicit instructions and procedures.

**Comments Re-visiting FCC Decisions With Regard to IBOC and Re-arguing Issues Previously Briefed Are Not Properly Considered Here**

Previously in this proceeding, the Commission solicited and received comments, with respect to the Commission's DAB policy goals and selection criteria for a U.S. DAB system. In addition, the Commission received comment on the NRSC's FM IBOC Evaluation Report evaluating test results and making conclusions and recommendations on iBiquity's FM IBOC system<sup>9</sup> and on the NRSC's AM IBOC Evaluation Report regarding iBiquity's AM IBOC system.<sup>10</sup>

Thereafter, in its 2002 First Report and Order, the Commission selected in-band, on-channel (IBOC) as the technology that will bring the benefits of digital audio broadcasting to AM and FM radio broadcasters efficiently and rapidly.<sup>11</sup> The Commission stated that the record in this proceeding demonstrates that IBOC is the best way to advance the Commission's DAB policy goals. *Id.* It further agreed "with the NRSC and the majority of commenters that the potential for new interference from IBOC operations is insignificant when compared with the advantages and opportunities inherent in this digital technology." *Id.* As to AM daytime IBOC operation, the Commission said that "the introduction of AM IBOC will, undoubtedly, result in some additional interference, both to the host station and to other stations. However, . . . the potential benefits of digital AM IBOC far outweigh the small possible increase in interference."

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<sup>9</sup> *Public Notice*, MM Docket no. 99-325, rel. Dec. 19, 2001.

<sup>10</sup> *Public Notice*, MM Docket No. 99-325, rel. April 19, 2002.

<sup>11</sup> *First Report and Order*, MM Docket No. 99-325, rel. October 11, 2002, at ¶ 32.



*Id.* at ¶ 24. The Commission selected the hybrid AM and FM iBiquity IBOC systems tested by the NRSC as *de facto* standards for interim digital operation. *Id.* at ¶ 44. It specifically stated that “the Commission will no longer entertain in this proceeding any proposal for digital radio broadcasting other than IBOC.” *Id.* It supported selection of a single DAB transmission standard, and it invited the industry to develop a formal AM and FM IBOC standard. *Id.*

Thus, NAB urges the Commission to dismiss the individual and other commenters that here advocate reconsidering IBOC as the approach for digital radio or urge other spectrum options for digital radio.<sup>12</sup> The Commission has already decided those issues.

Similarly, the Commission should not address here the variety of individual and other commenters that express theoretical or analytical engineering concerns regarding AM IBOC nighttime operation and other theoretical interference concerns.<sup>13</sup> While important to be adequately addressed, those issues are not germane to the scope of the issues in the present comment cycle and are therefore not properly re-argued here.<sup>14</sup> The Commission has been briefed on these issues and should deal with them there.

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<sup>12</sup> See, e.g., Comments of Gregory J. Buchwald, MM Docket No. 99-325, filed July 18, 2005 (Buchwald); Comments of Timothy C. Cutforth, P.E., MM Docket No. 99-325 (Cutforth), filed July 18, 2005; Comments of George M. Frese, P.E., MM Docket No. 99-325, filed July 18, 2005; Comments of Leonard R. Kahn, PE, FIEEE, MM Docket No. 99-325, filed July 8, 2005 (Kahn); Comments of Larry Langford, MM Docket No. 99-325, filed July 18, 2005; Comments of Press Communications, LLC, MM Docket No. 99-325, filed July 19, 2005 (Press); Comments of Voice In The Wilderness Broadcasting, Inc., MM Docket No. 99-325, filed July 18, 2005.

<sup>13</sup> See, e.g., Buchwald, *supra*; Cutforth, *supra*; Kahn, *supra*; Comments of Barry D. McLarnon, P. Eng., MM Docket No. 99-325, filed July 18, 2005; Press, *supra*; Comments of Reunion Broadcasting, L.L.C., MM Docket No. 99-325, filed July 18, 2005.

<sup>14</sup> Because of the lack of nighttime AM IBOC test results from the NRSC, the Commission in its 2002 IBOC Order deferred authorizing nighttime use of AM IBOC until completion of further testing. In 2004, the Commission sought comment on NAB’s

Several commenters provided detailed anecdotal reports of interference on the AM band due to IBOC operations. Recognizing the fact that the implementation of IBOC involves trade-offs as we mentioned in our previous comments in this proceeding, we request that the Commission keep track of these reports and address those that relate to interference within stations' protected service areas. It is extremely difficult to predict where and how interference may impact individual AM stations due to the natural propagation mechanisms affecting AM frequencies daily and seasonally. We are optimistic that any interference to protected coverage areas created by IBOC will be adequately dealt with on a case-by-case basis either by the adjustment of IBOC digital energy or other means. Therefore it is very important that the Commission begin now to characterize the interference environment nationwide as stations go on the air with IBOC with a view toward setting up interference mitigation techniques in the final rules, whenever they are developed.

Broadcast Company of the Americas (BCA) in its comments relates that IBOC operation in Southern California results in adjacent-frequency interference to an English language AM station in Mexico for which BCA supplies programming and which has a large listenership in Southern California.<sup>15</sup> BCA claims that its situation is analogous to many situations in which two U.S. stations are operating on first adjacent frequencies and are located in relative proximity to one another. BCA requests that the Commission halt

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recommendations concerning nighttime operation of AM IBOC based on the evaluation and participation of an NAB *ad hoc* technical group of broadcast engineers in iBiquity's testing and simulation of AM IBOC at night. *Public Notice*, MM Docket No. 99-325, rel. April 14, 2004. In response, the FCC received comments on iBiquity's AM nighttime test results and NAB's technical group evaluation of those tests.

<sup>15</sup> Comments of Broadcast Company of the Americas, LLC, MM Docket No. 99-325, filed July 18, 2005 (BCA).

IBOC operations by AM stations and oversee full testing to determine the real world potential for interference by AM IBOC stations and then modify NRSC-5 accordingly. In response, NAB makes three points. One, BCA should apply to the FCC for individual interference resolution as allowed for in the *First Report and Order*.<sup>16</sup> Two, the Commission has acknowledged that there will be instances of interference but has decided that the overall benefits are worth the trade-offs required.<sup>17</sup> And three, it is vitally important that AM IBOC move forward apace with FM digital operations, and be incorporated in receivers at the same time as FM technology is implemented, for fear that AM could otherwise be left behind and never make the transition to hybrid digital operation and be implemented in receivers on its own.

#### **NRSC-5 Is Sufficiently Complete To Serve As the Basis for the FCC's IBOC Technical Rules**

NAB agrees with CEA that “[t]he IBOC digital radio standard’s lack of an audio codec, though not optimal, is acceptable.”<sup>18</sup> In the NRSC’s standards development process, iBiquity Digital consistently maintained that it was unable, for internal business reasons, to disclose the technical details of its audio codec that was to be used in iBiquity’s IBOC system. The NRSC, after much debate and consideration, decided that it was preferable to maintain the single system approach that it had originally sought from system proponents. The Committee therefore proceeded to standardize the rest of the iBiquity system excluding the codec and to define as well as possible an interface describing the use of codecs with this system. NAB agrees with CEA that, given the

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<sup>16</sup> *First Report and Order*, *supra*, at ¶ 29.

<sup>17</sup> *Id.* at 24.

<sup>18</sup> CEA, *supra*, at 2.

consensus of the committee, it was acceptable to publish the standard without a codec specification and that this represents a workable solution to a thorny problem. *Id.* at 2-3.

Others disagree, and assert that the standard is deficient and incomplete.

Microsoft, Broadcast Signal Lab and Impulse Radio, in joint comments, and the individual comments of Jonathan E. Hardis and of Impulse Radio maintain that the codec must be specified and urge the Commission to remand the standard to the NRSC for specification of iBiquity's HDC codec.<sup>19</sup> This is unnecessary. iBiquity's system, and its codec, is in the marketplace as the *de facto* standard, and is available for licensing independently or with iBiquity's implementation software.

Moreover, parties are not required to use iBiquity's HDC codec. The existing standard allows for insertion of a codec other than iBiquity's HDC codec. Contrary to the assertion of Microsoft et al.,<sup>20</sup> the FCC can adopt NRSC-5 without further amendment and specification of a codec identifier (codec registration and signaling mechanism, as Microsoft et al. denominate it), since audio codecs are self identified by digital radios, i.e., radios built to react to a specific compression scheme will work when data using that compression scheme is delivered to the radio, and the radio will simply ignore compression schemes delivered to it for which it was not built.<sup>21</sup> Lastly, there is

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<sup>19</sup> Comments on National Radio Systems Committee's "In-Band/On-channel Digital Radio Broadcasting Standard NRSC-5," MM Docket No. 99-325, filed July 18, 2005 (Microsoft et al.); Comments Re: DA 05-1661 (Hardis), MM Docket No. 99-325, filed July 14, 2005 (Hardis); Comments of Impulse Radio on National Radio Systems Committee's "In-Band/On-Channel Digital Radio Broadcasting Standard NRSC-5," MM Docket No. 99-325, filed July 18, 2005 (Impulse Radio).

<sup>20</sup> Microsoft et al., *supra*, at 4-5.

<sup>21</sup> The NRSC is in fact working on developing a specific codec identifier, at the request of Microsoft and others, which is a follow-on activity to the main system documentation. While this may provide benefit as a convenient way to identify use of different

an opportunity in the existing standard for additional codecs optimized for low bit rate applications to be supported within DAB service, *e.g.*, reading services for blind. It is important and now possible to allow for insertion of other codecs for such additional services in addition to the main program service.

Similarly, and contrary to the suggestion of Impulse Radio,<sup>22</sup> the addition of a fully specified advanced data broadcasting transport protocol is not necessary to incorporation of the main IBOC transmission standard into the Commission's rules. Impulse Radio states that the absence of a data transport scheme in the standard omits "a critical component in encouraging the rapid adoption of DAB radio by broadcaster, receiver and equipment manufacturers and, in particular, consumers." *Id.* NAB disagrees, as does CEA. CEA points out that, while there is a "placeholder" in NRSC-5 for an advanced data services specification, such specification is independent of the main transmission scheme and unnecessary to be considered along with the documentation in NRSC-5 for the main transmission standard.<sup>23</sup> CEA states that, should the FCC seek to include the data transport protocol in its rules, comment would be appropriately solicited on only that specification, and that this approach would be preferable, in order to avoid delay in final authorization of IBOC operation. *Id.* NAB agrees. The FCC may, in fact, demur from including the data specification in its rules, as it has largely if not wholly de-regulated the provision of data services, for both radio and television.<sup>24</sup>

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compression schemes to a radio, it is not critical for deployment of IBOC transmission systems, as use of multiple codecs is not precluded by the absence of such an identifier.

<sup>22</sup> Impulse Radio, *supra*, at 2.

<sup>23</sup> CEA, *supra*, at 3.

<sup>24</sup> NAB notes that NRSC is close to concluding its work on defining an advanced data services transport protocol and anticipates final approval of same in short order. This, however, should not alter the FCC's consideration of the main IBOC standard.

## **The NRSC Process was Fair, Open and Thorough**

NAB in its initial comments described the years-long work of the NRSC on digital radio, as well as NRSC's operation under strict due process procedures, openness, diverse participation and inclusiveness of diverse views. Entercom, Greater Media and Infinity make these same points.<sup>25</sup> The current phase of NRSC DAB work began with a Request for Proposals for a complete digital radio system, which resulted in multiple proponents that ultimately coalesced into a single proponent system, that of iBiquity Digital. NRSC began its work to evaluate and document that resulting iBiquity IBOC system. It was not the Committee's intention to "build" an IBOC system from separate parts, as Impulse Radio's comments suggest was possible.<sup>26</sup> The process took a number of years and in fact was halted by the NRSC after determination that the audio quality of the codec presented after the merger of the remaining two proponents was insufficient, in the Committee's opinion. iBiquity was asked to provide a higher quality codec, in keeping with the original NRSC request for a single DAB system. iBiquity complied, and the standards process was re-started, and ultimately produced NRSC-5. All the while the Committee adhered to its due process procedures and its demand for superior performance.

Impulse Radio, in its comments to the FCC, has asserted that the resulting IBOC standard is anti-competitive and that the NRSC process was dominated by iBiquity, resulting in unfair competitive and commercial advantage.<sup>27</sup> NAB vociferously disagrees. Contradicting Impulse Radio's suggestion that the selection of the current

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<sup>25</sup> Entercom, Greater Media and Infinity, *supra*, at 2.

<sup>26</sup> Comments of Impulse Radio, *supra*, at 4.

<sup>27</sup> *Id.*, *passim*.

codec and its lack of disclosure have been made to accommodate the commercial needs of iBiquity, *id.* at 4, is the fact that the NRSC shut down its process and forced iBiquity to discard what the Committee deemed an inferior codec. As to disclosure of the codec, the Committee was faced with the undesirable choice between ending standardization (potentially stalling IBOC deployment) and standardizing the system without the codec. It was the consensus of the Committee to continue the standardization process. All save a handful of Committee members believed that the result was workable.<sup>28</sup>

The NRSC working group that developed the standard conducted an extensive “comment resolution” at the end of the process. Impulse Radio, a data broadcasting company frustrated by the working group’s focus on completing work on the main transmission standard rather than simultaneously working on the data portion of the standard, filed with the NRSC comments similar to those it submitted to the FCC. In resolving Impulse’s comments, the working group reached a consensus that the process was *not* improperly dominated by iBiquity and that the standard was *not* anti-competitive, as asserted by Impulse. The DAB Subcommittee approved the main standard (NRSC-5) without a dissenting vote (Impulse abstained). Impulse appealed, as is provided in the NRSC rules, but voluntarily withdrew its appeal prior to the convening of an Appeals Board. No other appeals were filed.

Impulse’s comments also complain that iBiquity was allowed to dominate the process to its unfair commercial advantage in relation to the data broadcasting standard, now nearing completion. Again, to the contrary, the Committee and its working group

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<sup>28</sup> NAB is at a loss to explain Impulse’s claims of non-disclosure of the “scrambler sequence” for the main transmission system. *See* Impulse Radio at 6, 11. iBiquity disclosed the scrambler information before the vote on the standard and it is included in NRSC-5.

developing both the main transmission standard and the advanced data standard determined to place priority on the work on the main system specifications and to conduct parallel work on data as it could. iBiquity was not able to complete its internal documentation of its data broadcasting standard along with its intensive work on the reference documents critical to the main transmission standard and thus work on the data side was in fact delayed.<sup>29</sup> There is no evidence, however, to suggest that the delay was the result of an intention to advantage iBiquity, as Impulse asserts. During the comment resolution phase, the working group considered and rejected similar comments by Impulse.

Further belying Impulse's claim that iBiquity's data transport protocol is insufficient and harmful to competition, *id.* at 6, is Impulse Radio's withdrawal of its MAT data transport protocol from Committee consideration and its statement to the working group that "while AAS [iBiquity's data transport protocol] is not ideal Impulse Radio will be able to work with it."<sup>30</sup>

NAB thus urges the Commission to reject Impulse's claims that the NRSC process was skewed to allow iBiquity unfair commercial advantage. We believe that the rejection of Impulse's comments by the participants in the NRSC process, representing a diverse array of interests and their approval of the working group's evaluation and

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<sup>29</sup> When a standards developer is dealing with a single proponent, there are almost certainly situations related to that proponent that will affect the developer's consideration of issues. Such was the case here.

<sup>30</sup> NRSC ISDWG Minutes of July 7, 2005 meeting, at 4.

[http://www.nrsstandards.org/nrsc/NRSCFiles/Minutes/ISDWG%20Minutes/M\\_050707I SDWG.pdf](http://www.nrsstandards.org/nrsc/NRSCFiles/Minutes/ISDWG%20Minutes/M_050707I SDWG.pdf).



documentation stand in stark contrast to the complaints of Impulse Radio. We submit that the FCC should view their comments with similar skepticism.

### **Conclusion**

NAB has great confidence in the NRSC's faithful documentation of iBiquity's IBOC standard, as chosen by the FCC, as we do in NRSC's earlier evaluation of the AM and FM IBOC systems. We commend NRSC-5 to the Commission and urge its incorporation into the FCC's rules as soon as practicable.

Respectfully submitted,

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